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THE LOG OF THE LAB

Items of Current Research

FOREST PRODUCTS LABORATORY* FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

Madison, Wisconsin



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A WORD FROM THE DIRECTOR:
After a considerable lapse of time THE LOG OF THE LAB is again before you, to be hereafter, we trust, a more frequent visitor. It will not make any excessive inroads on your time. Its purpose is to tell you, in "painless" form, the current research progress of the U. S. Forest Products Laboratory. The cause it represents is one in which we feel sure of your interest and cooperation — THE EFFICIENT AND PROFITABLE UTILIZATION OF OUR FOREST RESOURCES.
Carlile P. Winslow

SAFETY BUBBLES

If the life of your best friend depended on a bubble, his chances of survival might seem rather thin. Nevertheless the Forest Products Laboratory recently used bubble films in a series of very careful tests that may spell the difference between life and death for many an aviator in time to come.

The problem was, simply, this: How much twisting can the wing beam of an airplane stand without breaking? Wings of planes in flight have been known to crumple

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INTERNATIONAL

Since the last issue of the *Log*, representatives of the following countries have studied at the Laboratory for periods of a week to a year or more: Australia, Brazil, British Malaya, Canada, China, England, Finland, Germany, Holland, India, Japan, Mexico, New Zealand, Poland, Rumania, Russia, Scotland, Sweden.

"The murmuring pines * * *

The Kiln Drying of Southern Yellow Pine Lumber, Department of Agriculture Technical Bulletin No. 165, is a publication aimed particularly at the reduction of degrade in Select and No. 1 Common during and immediately after kiln drying. The information given in this bulletin is based on expert knowledge of the southern pines, the kilns used to dry them, and the direct financial benefit of improved kiln practice as demonstrated in case after case.

* * * and the hemlocks"

Properties of Western Hemlock and their Relation to Uses of the Wood, Department of Agriculture Technical Bulletin No. 139, is another Laboratory publication just off the press.

Copies of these bulletins can be obtained free from the Department of Agriculture, Washington, D. C., while the supply lasts. (Also those listed on p.4.)

* Maintained at Madison, Wis., in cooperation with the University of Wisconsin

UNUSED PULPWOODS MAY HELP TO RECAPTURE VAST U. S. PAPER MARKETS. More than half of our annual paper consumption of 15 million tons is derived from foreign sources either as wood, pulp, or paper.

One field for pulpwood development lies in the widely distributed and rapid-growing pine forests of the South. In the last ten years the annual paper production in the South has nearly trebled. Expansion of present pulping facilities and development of new projects is the trend.

With greater production must come greater diversification. Some mills must turn from kraft, the tough brown wrapping and bag material that is the main southern pine pulp of today, to the white papers that offer the big, diversified high-tonnage outlets.

After ten years of pioneering, the Forest Products Laboratory has worked out a modified kraft process with two-stage bleaching that produces a strong, light-colored pulp from southern pine that will give a good account of itself in bond, writing, book, and wrapping papers, and as the strength ingredient of newsprint.

Another promising source of light-colored papers lies in unused Douglas fir and certain other western woods. Some 4,000,000 cords of Douglas fir material, over one-fourth of our entire annual pulpwood requirement, is left in the

woods in logging operations every year because there is no present use for it.

Adequate studies should show how to adapt pulping processes to Douglas fir and certain other western woods so as to obtain from them a diversified line of satisfactory paper products, just as has been done for the southern pines and many other species. The Laboratory is preparing to make this its next major project in the field of pulping research.

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§ HOW SMALL IS AN UNDER-SIZE TREE? Meaning, too small to pay its way through the sawmill? The Forest Products Laboratory, Forest Experiment Stations, and lumber operators have been joining efforts to find out. § Trained foresters, keeping tab on the material from stump to freight car, have found that the lumberman merely breaks even when he cuts lumber from Lake States hardwoods less than 13 inches in diameter breast high, Arkansas pine less than 14 inches, Appalachian hardwoods less than 12 to 14. *Converted into lumber, these sizes just pay their way* through the sawmill. The *most profitable* minimum cutting diameter is considerably larger. § Further logging cost studies on southern pine are under way, and other studies are planned.

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ANCIENT SLEEPER IDENTIFIED

One hundred and fifty feet below the bed of the Yakima River, Washington, embedded in Mio-

cene lava poured out some 12 million years ago, a seven-foot log recently resisted the picks of U. S. Reclamation Service tunnelers. A specimen hacked off the monster and sent to the Forest Products Laboratory was identified by laboratory microscopists as a type of *Sequoia*, a relative of present-day redwoods.

PERMANENT MOISTURE-PROOF GLUE JOINTS MAY BE JUST AROUND THE CORNER. LABORATORY ENGINEERS TOOK CASEIN-GLUED PLYWOOD, TREATED SOME OF IT WITH CREOSOTE AND THE REST WITH BETA-NAPHTHOL IN OIL, AND EXPOSED IT TO DAMPNESS AND MOLD IN A FUNGUS PIT. SPECIMENS TAKEN FROM THE TREATED PLYWOOD AFTER TWO AND ONE-HALF YEARS IN THE PIT SHOWED IT TO BE NEARLY EIGHTY PER CENT AS STRONG, ON THE AVERAGE, AS THE DAY IT WAS PUT IN.



The Lab: What and Why

Established twenty years ago under the U. S. Department of Agriculture as a research agency of the Forest Service, the Forest Products Laboratory is organized and geared together in specialized activities to handle the problems of wood utilization from the growing tree right through to the finished product in service. Its equipment reproduces many of the im-

portant commercial wood-using processes, from sawmill to finishing room, from log yard to chemical plant and pulp mill.

Write us if you have a wood-using problem. Whatever your interest in forest products is, we have probably made some contact with it. Our interest is in helping you to use wood satisfactorily and efficiently. For the Forest Service believes that the future of American forest industry depends as much on *efficient use of wood* as on the *growing of more trees*.

A MOP MANUFACTURER a few months back wrote to the Laboratory stating that handles were splitting in the nailing machine where the mop attachments are put on. We recommended a blunt nail. The mop man tried the blunt nail and reduced his losses of mop handles to less than half of one per cent.

AN ENGINEER IN BERLIN has just completed a translation into German of "The Gluing of Wood," a practical treatise recently issued by the Forest Products Laboratory. This bulletin deals with all of the common gluing problems, with the various types of joint work and plywood construction in general use, and with the several kinds of glue and many species of wood. It is having a wide demand here and abroad.

Ask the Superintendent of Documents, Washington, D. C., for Department of Agriculture Bulletin No. 1500, "The Gluing of Wood." The price is 25 cents.

SAFETY BUBBLES (Cont. from p. 1)

and fail for no apparent cause, and it is possible that an unforeseen *wrench* or *twist*, combined with an already severe bending stress, was responsible for some of these accidents. U. S. Navy aviation officers wanted to make sure of the safety of their construction in this regard, so the Forest Products Laboratory was called on to find scientifically accurate figures for the *twist resistance* of all kinds and shapes of airplane wing beams.

It was a question that could not be answered satisfactorily by pure mathematics or accurately enough by ordinary mechanical tests. Some other method had to be worked out.

Take a beam of any shape (viewed end-on) that you please – square, triangle, the letter I, H, X, T, L, an oval, or what you will – and imagine this beam completely hollowed out and used as a pipe to blow bubbles with. Blow the bubble out only far enough to take a sort of flat-pincushion shape.

The air-capacity of this transparent pincushion is a direct measure of the twist resistance of the solid beam you started with.

This curious fact, discovered by a German physicist some years ago, was the clue used by Laboratory scientists to solve the Navy airmen's problem. Instead of building and breaking expensive model beams by the truckload,

they simply cut holes in aluminum plates, holes the same shape and size as the cross sections of the various kinds of wing beams, spread bubble films over the holes, inflated the films slightly, and then measured the volume of each bubble by contacts with a sharp-pointed micrometer screw. By comparison of bubble volumes the twist resistance of each shape of wing beam was determined, accurate to within 4 per cent, and a new element of safety was added to engineering design and to flying.

Only with very "tough" bubbles could these experiments have succeeded. After a long search, a marvelous bubble material – triethylaminoleate – was found. With water and glycerine it gives puncture-proof bubbles that stand for hours.

FOR FREE DISTRIBUTION

¶ Under certain conditions a stronger and more serviceable box for shipping use can be built from knotty lumber than from clear lumber. Circular 105, published soon by the U. S. Department of Agriculture, contains the Laboratory test data. ¶ "Selective Logging in the Northern Hardwoods of the Lake States," Bulletin T164, is the first complete publication in the series of cooperative logging cost studies now under way. ¶ "The Application of Silviculture in Controlling the Specific Gravity of Wood," Bulletin T168, tells the story of the growth-rings and how to divine from them the history of the tree and the strength of the wood.